MONTHLY JOURNAL OF
THE MUSHROOM GROWERS'
ASSOCIATION

MGA
BULLETIN

OCTOBER, 1961 · NUMBER 142

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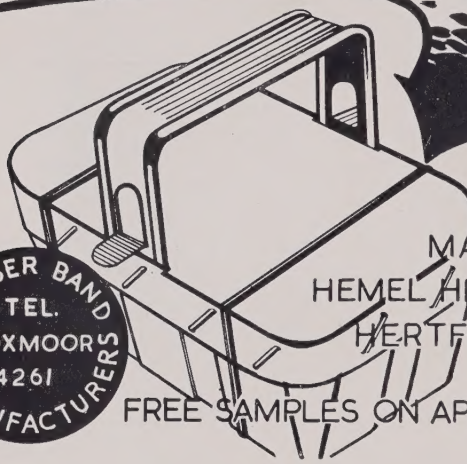

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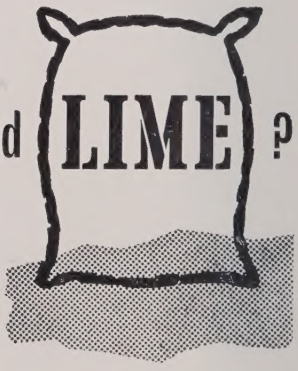

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Programme and Schedule

OF THE

Mushroom Industry Exhibition

and Conference

to be held at

THE ASSEMBLY HALL · TOWN HALL
GT. YARMOUTH

on 16th, 17th & 18th OCTOBER, 1961

PROGRAMME

Monday, 16th October:

2 p.m.—5 p.m.	Broadlands Mushroom Farm—Martham. Open to visitors. Machinery Demonstration.
8.30 p.m.	"Get Together" and Film Show—Carlton Hotel.

Tuesday, 17th October:

10 a.m.—5 p.m.	Mushroom Industry Exhibition.
1.30 p.m.	Golf Competition.
3.30 p.m.	Mushroom Competition.
5 p.m.	*Lecture:* DR. JAMES W. SINDEN
8.30 p.m.	Reception and Dance. Presentation of Cups, etc.

Wednesday, 18th October:

10 a.m.—5 p.m.	Mushroom Industry Exhibition.
10 a.m.	Ladies' Excursion—Norwich and The Broads.
11.30 a.m.	*Lecture:* FIBREGLASS LTD.
3.30 p.m.	*Lecture:* FRAULEIN EGER.
5 p.m.	Trade Exhibitors' Meeting.
8 p.m.—9.30 p.m.	*Lecture:* C. R. RASMUSSEN.

Thursday, 19th October:

Broadlands Mushroom Farm—
Open 10 a.m.—1 p.m.
Departures.

REGULATIONS OF SHOW

1. No Prize will be given for any mushrooms which have not been grown by the Exhibitor. Any person infringing this Rule will be disqualified from receiving any prize.

2. No person or firm will be allowed to take more than one prize in each class except where the prize is supplemented by a special prize.

3. No person or firm shall be allowed to make more than one entry in each class.

4. All exhibits must be ready for judges by 3 p.m. on Tuesday, 17th October, at which time all persons must leave the Competition enclosure except officials.

5. No exhibitor shall be allowed to sell and remove any exhibit or article until 5 p.m. the next day without the consent of the Show Secretary. Violation of this rule is liable to disqualify the exhibitor.

6. No exhibitor shall be allowed to bring into the show any produce for sale during the show.

7. All entries must be made on the Entry Form enclosed.

8. Competitors must send in their entry form NOT LATER THAN 13th October, 1961—first post.

9. Trade and non-competitive exhibits are cordially invited. Such exhibits will be governed by the Show Secretary.

10. Exhibitors may remove their mushrooms at 3 p.m., 18th October, but it will be appreciated if they are given to be sold for the benefit of MGA funds, as no entrance fees are being charged.

11. **The judges' decisions are in all cases final.**

12. Any protests from exhibitors must be handed to the Secretary in writing before 4 p.m. on the show day with a deposit of 5/- which will be forfeited if the committee consider the protest frivolous.

13. Judging to commence at 3-30 p.m. sharp—17th October.

14. The greatest care will be taken of all exhibits, but the committee will not be responsible for any delay, accident, mistake or loss or damage whatever. Exhibits are at the sole risk of the exhibitor.

15. The Show Secretary is empowered to move exhibits for more effective display after judging has taken place.

16. **The winners of cups not won outright shall enter into an undertaking** to restore the same to the Secretary in all respects in a similar condition as when delivered, three weeks before the next show. Cups are **fully insured.**

17. **Grading of Mushrooms for Competition.** The MGA Grading Committee after considerable discussion recommended a system of grading which was submitted to the Ministry's Recommended Grades Committee on which Mr. H. G. Boxall represented the MGA. These grades were accepted by the Ministry and included in their leaflet on Recommended Grades. **They are the grades which will be used for the purposes of the above Competitions and growers who intend to enter should take note.** (They are illustrated on the opposite page.)

18. **The word " Chip " in the Schedule means a container generally used for Mushrooms.**

WHITE BUTTONS White mushrooms, membrane closed, only just forming; stem length not to exceed $\frac{3}{4}$", cap diameter 1"—2$\frac{1}{2}$".

WHITE CUPS White mushrooms, membrane well developed or just opening with cap retaining a pronounced cup shape. Stem length not to exceed 1" from the apex. Cup diameter 1"—2$\frac{1}{2}$".

WHITE OPENS Being those that have advanced beyond the Cup stage the cap forming a letter 'T' with the stalk. Cap diameter 1"—2$\frac{1}{2}$" stem length not to exceed 1".

SCHEDULE OF CLASSES

(All cups are Challenge Cups and CANNOT be won outright. Cup winners receive a replica or miniature.)

Class 1 includes 1st prize of £5, 2nd of £3 and 3rd of £1.
Classes 2, 3, 4, 5, 6, 7 & 8 all include cash prizes of £3, £2 and £1.

Class 1. **THE MGA CUP.** Open to members of the MGA only. For the best three chips of WHITE BUTTONS packed 3 lb. in a chip.
The MGA Challenge Cup is presented by Messrs. HARDING BROS., of Tenterden.

Class 2. **THE MOUNT CUP.** Open Competition.
For the best chip of WHITE BUTTONS packed 3 lb. in a chip.
The Mount Cup is presented by Messrs. MOUNT & SON, Canterbury, makers of Mount Spawn.

Class 3. **THE BROOME & GREEN CUP.** Open Competition.
For the best chip of WHITE CUPS packed 2½ lb. in a chip.
The Cup is presented by Messrs. BROOME & GREEN of Covent Garden.

Class 4. **THE SMART CUP.** Open Competition.
For the best chip of WHITE OPENS packed 2 lb. in a chip.
This Cup and Miniature is presented by Messrs. PASK, CORNISH & SMART of Covent Garden.

Class 5. **THE THWAITES CUP.** Open Competition.
For the best two chips of mushrooms, one containing not less than 3 lb. WHITE BUTTONS and the other containing not less than 2½ lb. WHITE CUPS.
The Thwaites Cup was presented by the late JOHN THWAITES, Esq.

Class 6. **THE STABLE MANURES CUP.** Open only to those members who have not previously won a First Prize award in these competitions. One chip of mushrooms containing 2½ lb. of WHITE CUPS.
The Stable Manures Cup, with replica, is presented by Messrs. STABLE MANURES LTD., of Newmarket and Worthing.

Class 7. **THE T. J. POUPART CUP.** Open Competition.
For the best 3 chips of mushrooms. One containing 3 lb. of WHITE BUTTONS, one containing 2½ lb. of WHITE CUPS and one containing 2 lb. of WHITE OPENS. **AS PACKED FOR MARKET,** with plain lid on and not identifying the exhibitor, no paper showing above the rim of the chip, i.e., no paper showing when the lid is on.
The T. J. Poupart Cup is presented by Messrs. T. J. POUPART LTD., of Covent Garden.

Class 8. **MONRO CUP. 12 Mushrooms on a Plate.** (plate will be provided). Comprising 4 BUTTONS 4 CUPS and 4 OPENS. To be judged purely on Uniformity, Appearance and Quality.

THE MONRO CUP is presented by Messrs. GEO. MONRO LTD., Hertford Road, Waltham Cross, Herts.

BUTTON CUP OPEN

Competition pointers:—For guidance of those entering the competitions, last year's entries were judged under the following headings:—Appearance and correctness of pack, weight of contents, size and uniformity of size, trimming (length and neatness), colour, shape, maturity, condition (defects).

The Competition Cups will be presented at the Garibaldi Restaurant, on Tuesday, 17th October.

The Exhibition will open at 9.30 o'clock and remain open until 5 p.m. each day.

The Bar will be open all day. A buffet will also be available for coffee and light refreshments whenever required.

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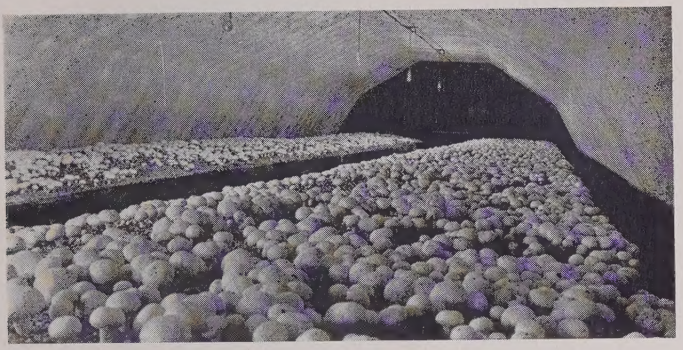

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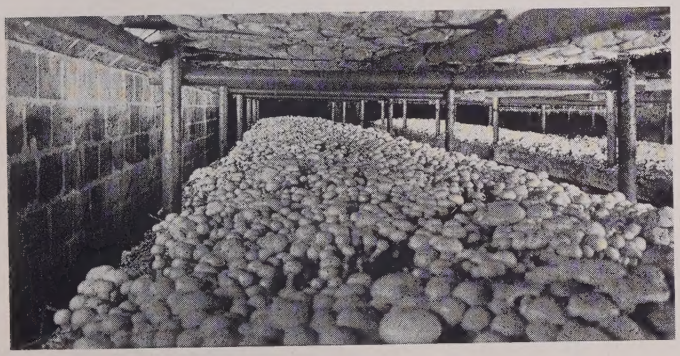

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OCT. - 1961
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EDITORIAL

WHITHER AND WHEN?

It is a very long stretch from the world of mushroom publicity to the present international situation but at least they have one thing in common—confusion.

It isn't that we of the Mushroom Growers' Association are confused about how to raise money or how to use it once it is raised. Left alone our house would continue to be run in a reasonably smooth and not too inefficient manner although, like everyone else, we have our internal disagreements.

The trouble is, that in this matter of publicity we are unlikely to be left alone for very much longer, for broad plans for a campaign which will embrace the whole field of horticultural marketing are now being worked out by the Horticultural Marketing Council, a Government sponsored body which was born about a year ago, has made lusty progress since, has about two years more to run under the Government's wing before it will be required to emerge and stand on its own feet financially.

There is too, the British Farm Produce Council, sponsored by the NFU and supported by them and the Milk Marketing Board, the Egg Marketing Board, the Potato Board and the much maligned—maybe somewhat undeservedly—Tomato and Cucumber Board as well as other organisations connected with the farming industry at large. Just recently the B.F.P.C. staged a splendid "Eat British" campaign in London.

We of the Mushroom Growers' Association are not critical of either organisation and indeed the writer of this Editorial can be numbered among the admirers of both.

No word of criticism is intended in either direction then—but the H.M.C. has quite clearly announced that it hopes, in the not too distant future, to produce a plan whereby it will be supported, lock, stock and barrel, by the industry it represents—horticulture. Quite

rightly, many think, the Council is to seek statutory powers to raise the money. So like it or not –and I personally do not dislike it—any contributions are to be on a compulsory and not a voluntary basis.

Just where do we in the MGA stand in this? Other similar organisations who have their own publicity schemes may well ask the same question. Should we now support the B.F.P.C., or should we wait and see what happens?

What is required is some clarification as soon as possible and there is little doubt that clarification will not be long in coming. For us it cannot come too soon. Uncertainty is as intolerable to us as it is to a lot of other people. We like to both look and plan well ahead.

WRA

Individual Publicity

MR. J. H. SCRIMGEOUR "AT HOME"

Recently, Mr. J. H. Scrimgeour of Huntick Farm, Lytchett Matravers, Dorset, held what has become his annual "At Home" on the farm when, on a Sunday afternoon, he entertained wholesalers and retailers from over a wide area. His farm is most attractively sited, looking as it does over the rolling Dorset countryside.

The programme included a tour of the farm, a cooking demonstration by the Southern Electricity Board and, afterwards, tea on the lawn. Various items of mushroom publicity were displayed and distributed.

Mr. Scrimgeour has been mushroom farming on his own for the past five years and has rather less than 10,000 sq. ft. on the tray system, with eight growing houses, four built of breeze blocks and four glasshouses (portable) with the usual type of insulation-fibreglass and roofing felt. The farm is serviced by a peak-heat shed and two spawn running rooms. Experiments are being carried out with a Hamurcol Paraffin heater. The compost is based on stable manure, the composting process taking 16 days from time of stacking. Mr. Scrimgeour is not afraid to let his compost spend five to six days in the peak-heat room if necessary. Four crops are taken a year, the average crop being 1½lb. per sq. ft.

The visitors found the farm of considerable interest and much valuable publicity was obtained.

GLASSHOUSE CROPS RESEARCH INSTITUTE

Dr. F. T. Last, Ph.D.(Lond.), D.I.C., A.R.C.S., of Rothamsted Experimental Station, has been appointed as Head of the Department of Mycology and Bacteriology at the Glasshouse Crops Research Institute in succession to Mr. P. H. Williams, who is retiring after 38 years' service, firstly at the Experimental and Research Station at Cheshunt and latterly at the Institute.

DARLINGTONS — STILL 100 PER CENT

W. Darlington & Sons, Ltd., of Worthing : 1860—1961

In the foreground a fork lift truck is entering a growing house which is being emptied after cooking out. Beyond the growing houses are the four new heat rooms.

No matter in what part of the World mushrooms are commercially grown the name Darlington of Worthing, England, is well known and much respected, not only because they were the first to introduce pure culture mushroom spawn to the grower in the United Kingdom or because they have been in the mushroom industry far longer than any other firm at present connected with it, but because, over the many years of contact with the trade, they have built for themselves a very high reputation which they richly deserve and which no one begrudges.

It is true to say that the growth and development of the industry in the United Kingdom owes a tremendous amount to Darlingtons. The firm was founded in 1860, had its headquarters in Hackney, London, and was then mainly concerned with the business of horticultural and agricultural sundries, with a branch in the Lea Valley and one in Worthing.

When hostilities broke out in 1914 eight sons of the late Mr. W. Darlington occupied executive positions in the business ; seven of them saw foreign service.

Mr. H. A. Darlington's department included Mushroom Spawn, in which he has specialised since 1908. He was well-known to nurserymen and outdoor ridge bed growers during the two world wars when mushrooms were considered in the Glasshouse Industry as only a "catch crop".

During World War II the firm was forced, owing to enemy action, to transfer its activities to its present premises in Worthing where, at the age of 71, Mr. H. A. Darlington remains at its head. With him in the business are his three sons, Harold, Bob and William.

Darlington's have sold Mushroom Spawn to commercial growers for well over sixty years. This has included a vast amount of the brick type, and later the pure culture type from France and America, the latter proving far more productive under the English methods of cultivation.

In 1932 Darlington's started processing their own pure culture spawn, now universally known as 100% Spawn. A modern Spawn Plant was erected in a secluded position at Shoreham-by-Sea and was followed by special laboratories for the provision of the advisory and technical service to the grower which today is well known and appreciated throughout the industry.

Picking and recording strain trials on the Experimental Farm, where there are always several hundred experimental plots in production.

It was this service to the grower that created the need for an experimental farm and 1948 saw the opening of this Field Laboratory at Lucksfield Nurseries, Angmering, Sussex, where they now have 90,000 sq. feet of cropping area under the tray system, laying 10,000 sq. feet of beds every week.

The farm is open to visitors every Monday by appointment and any information on methods of mushroom growing can be provided on the spot.

The farm is one of the most modern in the country and, as might be expected, the method of growing is based on the true rapid composting procedure. On the large concrete composting yard the stable manure is first thoroughly pre-wetted over a period of four days, and layered with chicken manure.

Turning is then carried out with a Linfield Turner, four turns being given in seven to eight days. The compost is then ready for filling into trays and processing in the pasteurising rooms.

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The directors of Lucksfield Nurseries are Harold Darlington, Bob Darlington and Eric Rucklidge. Eric Rucklidge actually manages the farm, but all three take an active part in organization and planning.

They are convinced of the value of compost analysis, and every batch of compost passing through the processing area is analysed three times—when raw, at the time of filling, and again when spawning. The initial analysis by the laboratories at Worthing decides the amount of nitrogen supplementation required, and the subsequent analyses check the state of the compost and allow a close estimate of its potentialities to be made.

See how they grow.

At the MGA's Southport Conference in 1957 growers heard Bob Darlington's strong advocacy of the open-stack method of placing trays in the heat rooms. Open stacking is now standard procedure on the Experimental Farm, not only in the pasteurising rooms, where processing may take up to five days, but also in spawn-running rooms and in the growing houses.

Spawning is carried out mechanically, using a Spawnmaster machine, and the spawning rate is approximately 15 square feet to the carton, although the tendency is to reduce the footage even more and 10 square feet to the carton may become the rule.

Being spawnmakers, the Darlingtons are aware that the whole question of spawning rates is a delicate one, and that their recommendations may be suspect in some quarters. Nevertheless the position is summed up by Harold Darlington when he says : 'That is our spawning rate and we do it because it pays us to. That is all there is to it.' Nevertheless, many trials have been carried out to arrive at the optimum spawning rate for their method of growing.

Four peak-heating rooms and four spawn-running rooms are grouped into one large 'processing area', with a covered gallery running between the two blocks of four rooms. The whole processing area has cost just short of £20,000 but this is in line with the directors' views that too much attention cannot be given to the business of making a compost. The new heat rooms are built of hollow clay tiles and foam slag blocks rendered with Foliac Graphite paste, a coat of vapour-proof aluminium paint, more Foliac paste and a final coat of aluminium paint. The ceilings are of Marlith board below five layers of Fibreglass Crown 75.

Casing normally is carried out about ten days after spawning, and a pasteurised mixture of equal parts by volume of pre-wetted

(Top): On the left, a Linfield Manure Turner. In the middle background one of the earliest manure turners and beyond, two of the new heat rooms.

(Bottom): The ducting system in one of the heat rooms. The top duct is of metal, the bottom of wood. An impressive shot, this, of a heat room.

Irish Granulated peat and chalk are used. Approximately seven tons of chalk are mixed with 21 bales of peat, and both mixing and application to the beds is done by hand.

Picking usually commences about 18 to 19 days after casing, and continues for six weeks. This allows five and a quarter crops to be taken a year, with a total yield per square foot including stalks of over 13 pounds. The average per crop stands at 2.48 pounds per square foot, and they are disappointed if they do not pick one pound in the first flush. The best single crop of the last twelve months totalled 3.8 pounds per square foot.

The individual tray unit on the farm is ten and a quarter square feet in size and is equipped with corner pegs to allow the open stacking already referred to. Growing houses are mainly of two categories; the older units are Bryon glasshouses insulated externally with Fibreglass and roofing felt, and the more recent houses are Universal Asbestos Cement units, again insulated externally. The glasshouses take 4,500 square feet, the Universal houses 2,500 square feet, and additionally there are now two extra large units that each hold 8,000 square feet of trays—exceptionally large units for this country.

Mr. T. E. Rucklidge, who has charge of Lucksfield Nurseries.

The specially constructed chog bins rather intrigued me. They were very large and when the time came for loading the chogs into a lorry, the sides and top were removed complete and the chogs, standing on the bottom tray, could be emptied into the lorry. The compost was emptied into lorries on the north-east corner of the farm—an obvious point as the prevailing wind blows from the south-west.

When I visited the farm there was a fine show of mushrooms in several of the houses, and the quality was splendid, too. The experimental Farm is concerned with many practical experiments as well as commercial production.

The total staff under Eric Rucklidge's direction, including part-time workers, now numbers some sixty-six.

The 'Head Office' is housed at Southcourt Road, Worthing, and it is from here that mushroom spawn and growers' sundries are despatched to all parts of the country, and exported too. Southcourt Road also houses F. C. Wood's laboratory, where he has charge of the growers' advisory service and also the analysis laboratory where compost samples are analysed at the rate of over 100 samples a week.

Dr. Klein, in charge of spawn research, also works at Southcourt Road and it is here that he gathers different strains of spawn from all parts of the world, and maintains them in pure culture for testing out, firstly in his own small trial houses, then later on a large scale on the Experimental Farm, and finally on the farms of several close grower friends of Darlington's. In this way every strain is given a thorough testing, not only on the firm's own farm, but also under other conditions, before it is released for production.

The spawn laboratory itself is at Shoreham, well away from any possible source of contamination. In fact Darlington's go to very considerable trouble and perhaps even unnecessary expense to ensure that there is no direct contact between those who grow the mushrooms and those who make the spawn. In this way there is no possible chance that trouble on one farm might be carried to another farm by way of the spawn.

"What", I asked before leaving, "is the biggest change that has come over the mushroom industry in the time your firm has been associated with it?"

"The passing of catch-cropping," Bob Darlington replied. "Mushroom growing is an all-the-year-round business now. That means that spawn demand is more constant throughout the year and so enables us to give a more prompt and efficient service by supplying spawn that is absolutely fresh from the laboratories. No grower need use spawn now that is older than two or three days and I am sure this is important for the best results."

WRA

EXTRACTS FROM RECENT SCIENTIFIC PUBLICATIONS

Morphogenesis of mycelial strands in the cultivated mushroom, *Agaricus bisporus*. **K. T. Mathew**, Botany School, Cambridge, 1961,Transactions of the British Mycological Society, 44, 285-90. 1 Text-figure.

Agaricus bisporus was grown in Petri dishes containing garden soil inoculated with a disc of 4% malt agar carrying the fungus. Microscopical observations on strand development were made *in situ* at regular intervals. Leading hyphae growing from the inoculum, especially where crowded, became bound together and covered by a profuse development of their finer branches (tendril hyphae). Branches of the strands occurred when some of the tendril hyphae grew away from the main strand to follow a stout branch hypha, or an unrelated

wide hypha which crossed the path of the strand. It was concluded that morphogenesis of mycelial strands in *A. bisporus* is similar to that already observed in *Merulius lacrymans* and *Phymatotrichum omnivorum*.

Comparison of unsterilised garden soil with sand, acid—washed and unwashed, sterilised and unsterilised, showed that strand formation was best in unsterilised soil and next best in sterilised unwashed sand. Adding different quantities of a nutrient solution to inoculated Petri-dishes filled with sterilised acid washed sand showed that the frequency of strand formation was inversely related to the concentration of the free nutrients in the surrounding medium. PBF

Marchidan, D., Mateescu, N., and **Petrescu, G.** Replacing horse manure in mushroom growing (Inocuirea gunicului de grajd in cultura cinpercii comestible) 1961, Gradina, Via si Livada, 6, P.17-21. Summaries in English, French, German and Russian.

The authors refer to work on synthetic composts by Gromov in the U.S.S.R., Stanek in Czechoslovakia and the American workers Lambert, Yoder and Sinden. Twelve composts were compared in order to find a readily available replacement for horse manure.

Compost	Total yield	
	Kg.	lb.
1. Horse manure 100% (Control)	84.48	185.8
2. Pig manure 100%	14.0	30.8
3. „ „ 75% + horse manure 25%	35.83	78.8
4. „ „ 50% + „ „ 50%	42.0	92.4
5. „ „ 33% + „ „ 67%	39.46	86.8
6. „ „ 50% + „ „ 25% + wood shavings 25%	31.25	68.8
7. „ „ 50% + „ „ 35% + „ „ 15%	39.58	87.1
8. Cow manure 33% „ „ 67%	55.56	122.2
9. Wood shavings 50% + „ 50%	51.55	113.4
10. „ „ 33% + „ 67%	67.66	148.5
11. „ „ 25% + „ 75%	59.84	131.6
12. Maize stalks 33% + „ 67%	64.80	150.5

The composts containing 25% and 33% wood shavings and 33% maize stalks added to horse manure (mixtures 10, 11 and 12) produced the most flushes (6-7), the best quality mushrooms, and, next to the control compost (100% horse manure), the highest yields. Composts containing pig manure gave poor yields, but the cow + horse manure

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mixture did a little better. Mixtures 10, 11 and 12 are therefore recommended to growers. PBF

Docea, E., Capetti, E. & Curticopeanu, G. (1961) Parazitii ciupercii comestible *Psalliota compestris* (L.) Quel. si combatera lor. (Parasites of edible mushrooms *Psalliota compestris* (L.) Quel. and their control).

Gradina, Via Si Livada, X, no. 2 (Feb.), 51-57.

(In Roumanian, with Russian, French, German and English summaries).

After making a series of observations and tests, the authors identified several bacteria, fungi and pests which cause severe injury to cultivated mushrooms, such as *Fusarium agaricorum*, Sarazin; *Fusarium oxysporum*, Schliecht; and *Verticillium agaricinum* (Link) Corda; which cause stunting, yellowing and desiccation of the sporophores.

Vert-de-gris, produced by *Myceliophthora lutea*, Cost., always occurs in mushroom crops. *Monilia fimicola*, Cost. et Matr. is very common.

The authors give the control measures which should be taken against plant and animal pests. (These are given in Roumanian only. The chemicals mentioned are:—calcium chloride, formalin, caustic soda, Bordeaux mixture and sulphur). DG

Hussey, N. W. "Identification of Phoridae (Diptera) attacking cultivated mushrooms in Britain".

Ann. & Mag. Nat. Hist. 13, 599-603, 1960 (Published 6th April, 1961).

Paper illustrates differences between the three species *Megaselia halterata*, *M. nigra* and *M. bovista* in the adult and immature stages.

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MUSHROOM GROWING BEHIND THE IRON CURTAIN

Strenuous Efforts to Increase Production in East Germany

Right: W. P. Wyltschew Bulgaria.
Left: M. A. Panow – Moscow.

Delegates and others attending a mushroom industry conference held in East Germany in June, under the auspices of the Veg Champignon- zucht at Dieskau, the research station which has as its Director, Dr. W. Arnold, an Honorary Member of the MGA, learned that strenuous steps are being taken to increase production, both with regard to an expansion of existing and new mushroom farms, and with regard to production per sq. ft. per year.

An overall picture of the industry included the information that the cultivation of mushrooms had, throughout the world, developed remarkably over the last thirty years, especially in "capitalist countries", and the Socialist countries were endeavouring to do likewise. If this was to be achieved more and more research, both scientific and practical, was necessary, and close co-operation between all concerned was important.

Average production at the Dieskau plant had increased by between 50% and 100% following the provision of pasteurising facilities and the cost of the installation and the working of it took only 9% of the additional income.

Composting of stable manure took from six to 12 days with two turns at 3 or 4 day intervals. Nitrochalk or sulphate of ammonia, superphosphate and gypsum are added to improve the compost. Water content of the finished compost is from 70% to 75%.

Two to three days were occupied with pasteurisation at temperatures varying between 115° F. and 140° F. Low pressure steam, when the trays were filled, stimulated the fermentation process and when the compost temperature reached between 125° F. and 140° F. two to four air changes per hour were introduced. Compost intended for ridge or flat beds was also pasteurised and spawned, with the spawn running through about 70% of the compost before being laid.

Within the DDR, spawn is produced only at the Dieskau centre—the sole producing and selling concern since 1958. It is expected that production will increase fourfold after 1961 reaching full capacity by 1965.

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Back l: Imre Heltay – Budapest.
Back r: W. B. Wyltschew – Sofia.
Front l: Dr. Arnold – East Germany.
Front r: Istvan Zavodi – Budapest.

Three varieties of mushrooms were now being grown, the best being "Schneekopfchen" (white). All three varieties were produced for preserving. The best of these new cultures were obtained from the wild form of *Agaricus bisporus* (Schaffer and Moller) from which "Schneekopfchen" was obtained. Two brown, two white and two cream varieties were being maintained and two, "liable to *Myceliophthera lutea*", were to be released for sale in the near future.

Since 1959 considerable research had been undertaken into the fungi which attack mushrooms. Many of these had been isolated and *Verticillium malthousei* was responsible for the heaviest losses.

In the immediate future special attention was being paid to *Myceliophthora lutea* and *Scopulariopsis* (*Monilia*) *fimicola*.

On the instructions of the Minister of "Landwirtschaft, Erfassung und Forstwirtschaft", a chemical laboratory had been established at Dieskau. This laboratory will occupy itself with the scientific analysis of the mushroom and its food value.

In 1957, when VEG Champignonzucht Dieskau was first established, mushroom production in East Germany comprised about 3,000 sq. meters. Its immediate task was to enlarge the bed area, instruct other centres in methods of mushroom cultivation, the production of spawn, general research including that connected with synthetic compost, research into various pests and diseases, the collection of technical literature and the training of technical experts to visit existing mushroom farms. Today the centre alone has 2,500 sq. meters of beds in 16 cellars and in addition has two purpose-built growing houses. Phyto-pathological research is carried out at Halle-Trotha as part of the work

at the laboratories there and spawn research is carried out to a limited extent at Torgau (Elbe).

At the Dieskau research station 87 people are employed, 52 of them women. There are five scientists in the scientific section and five assistants. Four experts are available to give practical advice to growers and three specialists are occupied with mushroom production at the plant.

In East Germany the total bed area for mushroom production has risen by leaps and bounds in recent years. From 3,000 sq. meters in 1956 it rose to 40,000 (1958), 80,000 (1959), 200,000 (1960) and 300,000 sq. meters in 1961.

To further the work carried out at Dieskau a committee, under the chairmanship of Dr. Arnold, was set up in 1960 with the object of attaining a total production of 900 tons of mushrooms in 1961 and 2,000 tons a year by 1965. To bring this about the committee is to establish show farms in old buildings, increase mechanisation all round, improve existing methods to increase production to the level achieved by other countries and to make a close study of the economic side of mushroom production.

In East Germany today there are 260 mushroom farms organised into two special associations and one special co-operative. In addition, smaller production units are centred at agricultural and horticultural production societies, at forestry plants, mining works, public stallion depots, and other places also play their part in total production. Production on a small scale is undertaken by pioneer groups, in schools and by clubs of veterans and similar organisations.

Ten courses, each of ten days, are carried out each year at the centre, to instruct newcomers in the industry.

Right : Imre Heltay Budapest.
Left : Istvan Zavodi Budapest.

At the conference, after an introductory visit to the International Horticultural Exhibition at Erfurt, the first scientific discussions were at Weimar where papers were read by Dr. Arnold, Dr. Heltay (Hungary) and Director Gheorghin (Rumania). At Dieskau, for the second part of the conference, papers were read by Mr. M. A. Panow (USSR) and Mr. W. B. Wyltschew (Bulgaria). It is hoped, in due course, to obtain a full report of the proceedings.

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PART I

THE MODERN PEAK-HEAT HOUSE

by **V. L. Barrow, B.Sc., N.D.A.**

During recent years there has been considerable change in the design and construction of the peak-heat house. Possibly the easiest way to describe this is to give particulars and illustrations of one of the latest to be constructed. The grower responsible for constructing this house, after trying other methods of peak-heating, decided to build a house along the lines of that used by Dr. J. W. Sinden. The increased yields convinced him that he was on the right lines and he consequently built larger houses to take care of his expansion. He is now—and has been for several years—a confirmed disciple of Dr. Sinden. Any variations in materials used in construction from the originals in Switzerland are due to availability in Britain.

The size of a house is of great importance as it must be capable of efficiently handling the number of trays with which it is to be filled, and in relation to the growing area to be utilised. Experience proves that the house should actually be made larger than appears to be necessary for immediate needs. The size of the house to be described is 45′ × 19′ × 12′—obviously that of a large grower—but dimensions can be varied so long as the fundamental design is followed. The volume works out at 10,260 cubic feet and it is filled with sufficient trays to fill 750 trays of a size of 3′ × 2′ or 4,500 sq. ft. of growing area. Thus the volume to growing area ratio is over 2 to 1. Construction details are cavity walls of Lignacite blocks with the cavity foam filled. The ridged roof is of corrugated asbestos sheets, the ceiling asbestos insulating boards covered with layers of fibre glass. The whole of the interior is sealed with Foliac Insulating paste and Foliac Vapourproof Aluminium paint.

The grower's reasons for this choice of materials are as follows :—

1. The Lignacite blocks are larger, lighter, quicker to erect and give better insulation than brick. Also in his locality they proved much cheaper.

2. The method of insulating was easier to install and more effective than other methods and materials previously used.

3. It is no use having insulating material unless it is kept dry—the ridged roof sheds the rain and the Foliac seals the inside surfaces in addition to providing insulation. The atmosphere in a peak-heat house will have a relative humidity of near 100 and, with a temperature of 130-140 degrees F., the vapour pressure exerted is very high. The importance of this can be quickly realised when it is realised that with a vapour pressure difference of only 10 m.b. between the faces of a 9″ brick wall, the amount of water vapour passing through in the course of one year will be in the region of 180 lb. (18 gallons) per 1,000 sq. ft. of area. Many growers have learned the meaning of this in hard cash, for in many cases insulation has been soaked and has lost its efficiency after only two or three peak-heats. In fact in many cases it has simply collapsed.

Ventilation of the house is often left too much to chance instead of being previously estimated and then installed in such a way that it can have minor adjustments made at the time of operation. It is now generally considered that the air movement must be at a rate of sixteen to eighteen times the volume of the house per hour. So a house of 10,000 cu. ft. volume must be equipped with a fan that will deliver over 2,500 c.f.m.—against the back pressure of ducting, etc. This is best done with the multivane or centrifugal type of fan and it should be belt driven in order that it can be easily regulated by changing the size of pulleys. It must be able to stand up to relatively high temperatures, high relative humidity and ammonia fumes. The motor can easily be erected outside the house.

FIG. 1.

In FIG. 1 it is seen that the fan is placed as near the ceiling as possible and well supported by brackets. Air is blown along the top ducting and returns by way of the bottom ducting. The outlet is a narrow slit running the full length of the ducting, which tapers in order to equalise pressure and distribution of the air.

Some growers prefer larger slits cut into the ducting at regular intervals, but in all cases the total area of the outlets must not exceed that of the delivery outlet area of the fan. The amount of air admitted to a peak-heat house varies at different stages so the air inlet from outside must be adjustable and its area in keeping with the inlet area of the fan.

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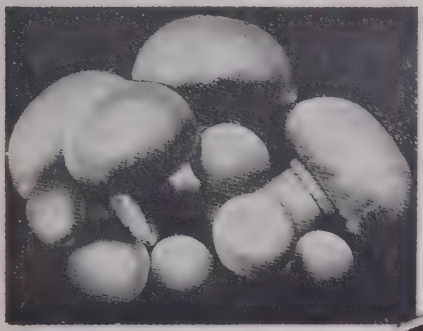

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	lb.		DAY	lb.	
1	31		32	–	
2	50		33	–	
3	–		34	276	
4	–		35	38	
5	757		36	–	2·88
6	149		37	43	(35
7	388		38	–	
8	–	·83 lb/sq/ft	39	–	
9	224	(7 days)	40	–	
10	–		41	150	
11	–		42	144	
12	–				3·00 lb/sq/ft
13	1158				(42 days)
14	493				
15	–	1·95 lb/sq/ft			
16	281	(14 days)			
17	–				
18	–				
19	122				
20	36				
21	81				
22	144	2·27 lb/sq/ft			
23	45	(21 days)			
24	–				
25	–				
26	–				
27	249				
28	–				
29	–	2·53 lb/sq/ft			
30	169	(28 days)			
31	–				

TOTAL PICK: 4998 lb

AREA: 1660 sq ft on trays

YIELD: 3·00 lb/sq/ft

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FIG. 2.

A simple way of doing this is shown in FIG. 2 and its position below the fan and in the ducting can be seen in FIG. 1.

It stands to reason that air cannot be brought into the house unless provision is made for its outlet.

The outlet in this case is about three feet from the floor at the opposite end of the house from the inlet and is shown in FIG. 3. This outlet is also adjustable and leads to an external ducting which rises above the eaves but is lower than the ridge of the building. The pulling or "chimney" effect of this may need adjustment for local conditions. Inlet and outlet vents need to be adjusted to each other. For example, during early peak heat if the outlet is not opened sufficiently steam will emerge from under the door. If opened too much air will be drawn into the house from under the door and as a result interfere with the planned recirculation.

FIG. 3.

The air movement within the house will be from the top ducting to the opposite wall, which acts as a baffle, and back to the bottom ducting for recirculation. As the reason for this air movement is to remove the ammonia and carbon dioxide from the surface of the compost as it accrues it is obviously very important to design the trays and stack them in such a way that this is possible. It is also necessary for the air to be blown against the baffle wall at a high speed. It is to insure this that many growers insist that a house should not be more than 20′ wide.

FIG. 4.

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The trays should be made so that when stacked there is a clear air space of 2-3″ between the top of the compost and the bottom of the tray above. Also they should not be stacked so high that they obstruct the flow of air across the room. Boards placed across the top trays act as a baffle, cutting down air friction. They also reduce drying out—or over-wetting of the compost from condensation—and help insure that the second phase composting is more uniform. This arrangement is shown in FIG. 4. As the stacking is done by Hyster Fork Lift truck the pallets are visible and the fact that they are single entry prevents air travelling across them.

FIG. 5.

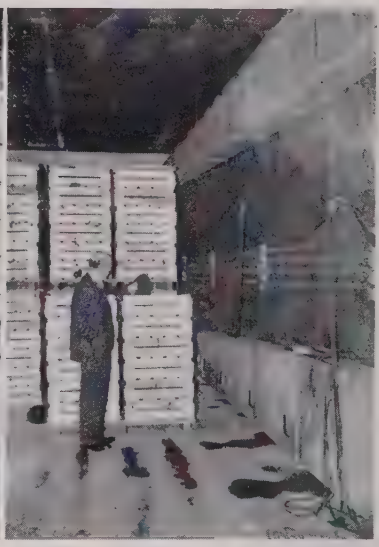

FIG. 6.

In order to insure that the air circulates uniformly over the trays there are several precautions that must be taken in addition to those mentioned above. If it is agreed that the space between the top trays and the ceiling is really a continuation of the ducting and the opposite wall is a baffle, it follows that there must also be a space left between this wall and the sides of the nearest trays. How this is done is shown in FIG. 5.

If the air is to be drawn from this space to the bottom ducting for recirculation then the spacing and sizes of the inlets are very important. By fitting each inlet with a slide, adjustments can be made to insure that the air intake to the ducting is uniform. These can be seen in FIG. 6. Some space must also be left between the sides of the trays and the wall, to act as ducting for the air which has passed over the trays, on its way back to the inlets. This particular grower says that trays stacked as shown in the illustrations should never exceed six stacks each two feet wide in a house 18-19′ wide.

During the first few hours of peak heat live steam is injected into the air stream—see FIG. 2. Any heat required during later stages may be introduced by means of the hot water pipes seen on the wall in FIG. 6. Some growers prefer a separate system of pipes for steam injection and in this case the perforations should be made in such a way that the steam immediately enters the air stream.

It is necessary to control temperatures, and remote reading thermometers are installed. In this house there are six different readings taken—three of compost, and three of air temperatures in different parts of the house. The cables of these can be seen in FIG. 6 and the point at which the readings are made in the wall cupboard shown in FIG. 2. A still more efficient method is to take recording temperatures. Although more costly it does give a complete story of the temperature behaviour of each compost, including any period that may have exceeded the limit of say 140 degrees F.

Although this is primarily a description of the construction of a peak-heat house it would not be complete without some mention of operation. A supplemented stable manure compost is used. Poultry manure and/or Covanic are used at the time of stacking and Shirley Lake is added by means of watering at the first turn. The short method of composting, introduced by Dr. Sinden, is used. At the time of filling the analysis of the compost shows over 2% nitrogen, moisture of 70-75% and a pH 7.5-8.0. There is ample free ammonia at this stage. At one time compost was compressed into trays by hydraulics but now it is done by hand and not compressed as much. After peak-heat, moisture content is still 70 +%, pH down to 7.0 and nitrogen over 2.5%—on the basis of dry matter, of course. Only 14-15 tons of stable manure are used to fill trays giving 4,500 sq. ft. of growing area. First flushes of 1 lb. are not unusual but final crops in 40 days cropping of under 2 lb. per sq. ft. are most unusual.

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1961 EXHIBITION AND CONFERENCE

Full Programme

Everything points to a successful gathering at Great Yarmouth on the occasion of the Mushroom Industry Exhibition and Conference on 16th, 17th, 18th and 19th October, commencing on the afternoon of Monday, 16th October with a farm visit and machinery demonstration at the Broadlands Mushroom Farm at Martham—the farm and demonstration will also be available to members on the morning of Thursday, 19th October.

By now, all members should have received copies of the programme and competition schedule and those members who have not received copies should apply immediately to the MGA Secretary.

The Golf competition for the MGA championship, with which goes the extremely handsome challenge trophy given by S. A. F. Sampson Ltd. accompanied by a beautiful replica of the rose bowl, will, it is hoped, attract keen competition and entries will be received at the MGA stand in the exhibition hall up to 11.30 a.m. on Tuesday, 17th October although it would be appreciated if those taking part will inform the Secretary as soon as possible, giving their handicap.

It is the hope of the organising committee, too, that the mushroom competitions, scheduled for Tuesday, will also be well supported.

Those members who have not yet applied for lecture tickets and for invitation cards to the Mayor's Reception should do so immediately. It is essential that a reasonably accurate forecast of numbers is given two or three days before the event in order to assess catering requirements.

Focal point of attention will inevitably be the four lectures, all of which promise to be of outstanding interest. **Dr. James W. Sinden** will, on Tuesday, talk about " What Every Young Mushroom Grower Should Know ", and in a letter says " My talk will include a bit of fatherly advice together with a few comments on new developments in the wind ; also what we can expect in the future ".

" ' The Halbschalentest ', a Simple Method for the Investigation of Casing Materials " is the subject of **Dr. Gerlind Eger's** paper. Miss Eger is from the Max-Planck Institut fur Kulturpflanzenzuchtung, Hamburg, Germany.

The "Halbschalentest" is executed in glass dishes with lids (10 cms diameter and 1 cm high) known as " Petri " dishes. In one half of the lower dish the mushroom mycelium is grown on sterile compost. When the mycelium has completely through-spawned the compost, the casing material has to be filled into that part of the lower dish which is still empty beside the compost. Mycelium then grows into the casing material and pin-heads, strands and fruit-bodies can be observed. Details of the method are reported on. By the aid of the "Halbschalentest" it has been proved that certain bacteria are the effective ingredients of the casing layer.

Mr. M. G. Drake of Fibreglass Ltd. will give a paper on mushroom farm insulation. A summary of his paper states :—

" To attempt to grow mushrooms commercially in uninsulated buildings is to court disaster. Optimum growing conditions vary with each stage of the mushroom's life cycle, but insulation in some form is needed in Peak Heat Rooms, Spawn Running Rooms and in Growing Houses. The paper will deal with the value of insulation, the methods of installing it, and the relative merits of various insulants for different buildings and for particular requirements.

A brief outline of the principles of heat transfer will help to show how the various insulants reduce heat losses caused by radiation, conduction and convection. The significance of a ' U ' value and how to calculate it, and the comparative ' U ' values of various constructions will be examined in this context.

Condensation is not peculiar to the Mushroom Growing Industry, but in certain conditions (e.g. Peak Heat Rooms) the problem becomes acute enough to deserve special attention. Methods for avoiding condensation will be discussed, with particular reference to ventilation, vapour barriers and insulation : it is by the right combination of these that condensation troubles can be reduced to a minimum.

Most mushroom farms consist of specially constructed buildings—rather than conversions—and these will have priority treatment in the talk. The different insulation requirements for Peak Heat, Spawn

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Running and Growing Houses will be examined, bearing in mind the conditions of temperature and humidity in each case. Comparisons will be made between the costs of various materials, their thermal insulation value and their use as part of the building structure. This will entail a comparison between among other things Fibreglass, mineral wool, expanded plastic, foamed slag blocks, wood wool slabs, fibreboards, asbestos boards and aluminium foil.

The paper will also deal briefly with the conversion of existing buildings for mushroom growing, and with other general aspects of heat insulation on the mushroom farm."

Finally—the lectures are being given in the above order—**Mr. C. R. Rasmussen,** head of mushroom research in Denmark, will talk about " Air in the Growing Room ", a subject which so frequently crops up in mushroom discussions and which is bound to attract the closest attention.

This final lecture on Wednesday evening will probably take place at The Carlton Hotel whilst the other three will be in the Town Hall.

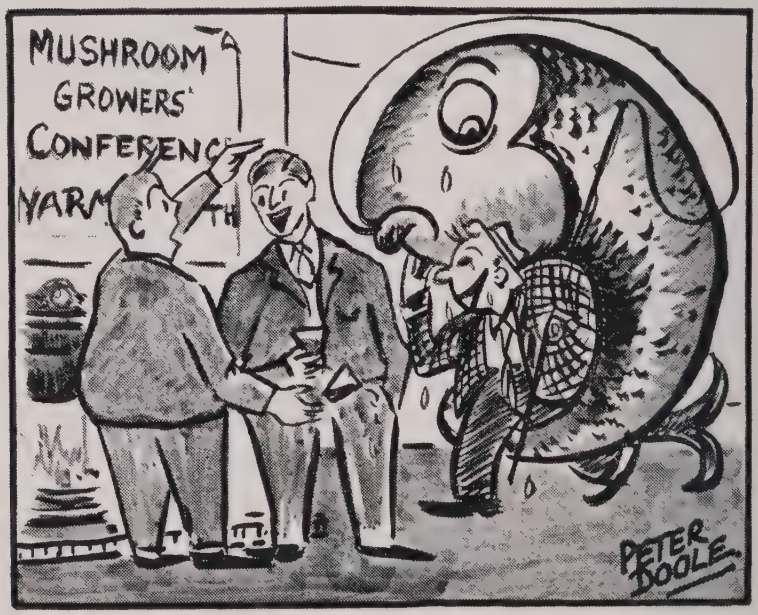
All the stand accommodation has been taken—the number available this year is somewhat smaller than on previous occasions owing to the limitations of the Assembly Hall. Again this year every effort has been made to limit the interference of lectures with the exhibition.

It is not necessary here to refer to the complete programme but members should consult this—on the cover of the competition Schedule—and are reminded that the times given for the various activities will be strictly adhered to.

For the Reception and Dance on Tuesday evening a dinner jacket or dark lounge suit should be worn.

A mushroom tray made of Portuguese maritime pine, made to MGA specifications, will be on show on the MGA stand and these may be obtained through Mushroom Growers Ltd. The inside measurements are 3′ × 2′. Already 10,000 of these have been sold. If you are contemplating installing a new boiler or boiler equipment then enquire at the MGA stand—it could save you money. Burgess & Co. (Engineers' Supplies) Ltd. have been appointed suppliers to Mushroom Growers Limited, the MGA's own trading company. Representatives of the firm will be on hand to give you advice.

Finally, Monty Mushroom will be on display as part of the publicity exhibition. Monty will be in a new form—the type you can display outside your farm.



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IN ICELAND NOW!

These days a new food is coming on to the Icelandic Market. These are mushrooms, grown in greenhouses in Laugalandi i Borgarfiroi, says a report in an Icelandic daily paper *Morgunbladid** of 30th July.

The Manager of the Nurseries, Bjarni Helgason, is the grower. He spent six months in Europe last winter, learning how to grow mushrooms and now the first crop is coming in. It is very gratifying to see such a good crop, both in size and quality.

Demand for mushrooms was very limited at first because few knew they could be grown in Iceland. They have not been grown in any quantity before; on the other hand tinned mushrooms have been available.

Many Icelanders travelling abroad have come to know how foreigners use fresh mushrooms and they are very glad to be able to add to their diet.

Housewives are now able to buy mushrooms in the larger stores—hotels have started using this new delicacy.

The mushrooms are grown from a Belgian spawn. Tinned mushrooms are expensive, but fresh ones are offered at a moderate price; indeed, the price has been reduced owing to the quantity available and prices are similar, if not a little lower, than those prevailing abroad.

As mentioned previously, the crop is a good one so fresh mushrooms will be on the market for the next few weeks.

*Translated from Icelandic by E. A. Gook of Faversham, Kent.

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